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PRIMARY DISTINGUISHING CHARACTERISTICS OF COMMON ECOLOGICAL REGIONS OF THE  
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CE1 COAST RANGE

Highly productive, rain-drenched coniferous forests cover the low mountains of the Coast Range. Sitka spruce and coastal redwood forests originally dominated the fog-shrouded coast, while a mosaic of western red cedar, western hemlock, and seral Douglas-fir blanketed inland areas. Today Douglas-fir plantations are prevalent on the intensively logged and managed landscape.

CE2. PUGET LOWLANDS

This broad rolling lowland is characterized by a mild maritime climate and flanks the intricately cut coastline of Puget Sound. It occupies a continental glacial trough and has many islands, peninsulas, and bays. Coniferous forest originally grew on the ecological region's ground moraines. Outwash plains, floodplains, and terraces. The distribution of forest species is affected by the rainshadow from the Olympic Mountains.

CE3. WILLAMETTE VALLEY

Rolling prairies, deciduous/coniferous forests, and extensive wetlands characterized the pre-19th century landscape of this broad, lowland valley. The Willamette Valley is distinguished from the adjacent Coast Range and Cascades by lower precipitation, less relief, and a different mosaic of vegetation. Landforms consist of terraces and floodplains, interlaced and surrounded by rolling hills. Productive soils and a temperate climate make it one of the most important agricultural areas in Oregon.

CE4. CASCADES

This mountainous ecological region is underlain by Cenozoic volcanics and has been affected by alpine glaciations. It is characterized by broad, easterly trending valleys, steep ridges in the west, a high plateau in the east, and both active and dormant volcanoes. Elevations range upwards to 4,390 meters. Its moist, temperate climate supports an extensive and highly productive coniferous forest. Subalpine meadows occur at high elevations.

CE5. NORTH CASCADES

The terrain of the North Cascades is composed of high, rugged mountains. It contains the greatest concentration of active alpine glaciers in the conterminous United States and has a variety of climatic zones. A dry continental climate occurs in the east and mild, maritime, rainforest conditions are found in the west. It is underlain by sedimentary and metamorphic rock in contrast to the adjoining Cascades which are composed of volcanics.

CE6. KLAMATH MOUNTAINS

The ecological region is physically and biologically diverse. Highly dissected, folded mountains, foothills, terraces, and floodplains occur and are underlain by igneous, sedimentary, and some metamorphic rock. The mild, subhumid climate of the Klamath Mountains is characterized by a lengthy summer drought. It supports a vegetal mix of northern Californian and Pacific Northwest conifers.

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CE7. EASTERN CASCADE SLOPES AND FOOTHILLS

The Eastern Cascade Slopes and Foothills is in the rainshadow of the Cascade Mountains. Its climate exhibits greater temperature extremes and less precipitation than ecological regions to the west. Open forests of ponderosa pine and some lodgepole pine distinguish this region from the higher ecological regions to the west where spruce fir forests are common, and the lower dryer ecological regions to the east where shrubs and grasslands are predominant. The vegetation is adapted to the prevailing dry continental climate and is highly susceptible to wildfire. Volcanic cones and buttes are common in much of the region.

CE8. SIERRA NEVADA

The Sierra Nevada is a deeply dissected block fault that rises sharply from the arid basin and range ecological regions on the east and slopes gently toward the Central California Valley to the west. The eastern portion has been strongly glaciated and generally contains higher mountains than are found in the Klamath Mountains to the northwest. Much of the central and southern parts of the region is underlain by granite as compared to the mostly sedimentary formations of the Klamath Mountains and volcanic rocks of the Cascades. The higher elevations of this region are largely federally owned and include several national parks. The vegetation grades from mostly ponderosa pine at the lower elevations on the west side and lodgepole pine on the east side, to fir and spruce at the higher elevations. Alpine conditions exist at the highest elevations.

EC9. CENTRAL CALIFORNIA VALLEY

Flat, intensively farmed plains having long, hot dry summers and cool wet winters distinguish the Central California Valley from its neighboring ecological regions that are either hilly or mountainous, forest or shrub covered, and generally nonagricultural. Nearly half of the region is in cropland, about three fourths of which is irrigated. Environmental concerns in the region include salinity due to evaporation of irrigation water, groundwater contamination from heavy use of agricultural chemicals, wildlife habitat loss, and urban sprawl.

CE10. SOUTHERN CALIFORNIA MOUNTAINS

Like the other ecological regions in central and southern California, the Southern California Mountains has a Mediterranean climate of hot dry summers and moist cool winters. Although Mediterranean types of vegetation such as chaparral and oak woodlands predominate, the elevations are considerably higher in this region. The summers are slightly cooler, and precipitation amounts are greater, causing the landscape to be more densely vegetated and stands of ponderosa pine to be larger and more numerous than in the adjacent regions. Severe erosion problems are common where the vegetation cover has been destroyed by fire or overgrazing.

CE11. SOUTHERN AND CENTRAL CALIFORNIA CHAPARRAL AND OAK WOODLANDS

The primary distinguishing characteristic of this ecological region is its Mediterranean climate of hot dry summers and cool moist winters, and associated vegetative cover comprising mainly chaparral and oak woodlands; grasslands occur in some lower elevations and patches of pine are found at higher elevations.

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Most of the region consists of open low mountains or foothills, but there are areas of irregular plains in the south and near the border of the adjacent Central California Valley ecological region. Much of this region is grazed by domestic livestock; very little land has been cultivated.

CE12. COLUMBIA PLATEAU The Columbia Plateau is an arid sagebrush steppe and grassland surrounded on all sides by moister, predominantly forested, mountainous ecological regions. This region is underlain by lava rock up to two miles thick and is covered in some places by loess soils that have been extensively cultivated for wheat, particularly in the eastern portions of the region where precipitation amounts are greater.

CE13. BLUE MOUNTAINS

This ecological region is distinguished from the neighboring Cascades and Northern Rockies ecological regions because the Blue Mountains are generally not as high and are considerably more open. Like the Cascades, but unlike the Northern Rockies, the region is mostly volcanic in origin. Only the few higher ranges, particularly the Wallowa and Elkhorn Mountains, consist of intrusive rocks that rise above the dissected lava surface of the region. Unlike the bulk of the Cascades and Northern Rockies, much of this ecological region is grazed by cattle.

CE14. SNAKE RIVER BASIN

This portion of the xeric intermontane basin and range area of the western United States is considerably lower and more gently sloping than the surrounding ecological regions. Mostly because of the available water for irrigation, a large percent of the alluvial valleys bordering the Snake River are in agriculture, with sugar beets, potatoes, and vegetables being the principal crops. Cattle feedlots and dairy operations are also common in the river plain. Except for the scattered barren lava fields, the remainder of the plains and low hills in the ecological region have a sagebrush steppe potential natural vegetation and are now used for cattle grazing.

CE15. NORTHERN BASIN AND RANGE

This ecological region consists of arid tablelands, intermontane basins, dissected lava plains, and widely scattered low mountains. The bulk of the region is covered by sagebrush steppe vegetation. The ecological region is drier and less suitable for agriculture than the Columbia Plateau, it is higher and cooler than the Snake River Basin to the east, and contains a lower density of mountain ranges than the adjacent Central Basin and Range ecological region to the south. Much of the region is used as rangeland.

CE16. CENTRAL BASIN AND RANGE

The Central Basin and Range Ecological region is characterized by a mosaic of xeric basins, scattered low and high mountains, and salt flats. Compared to the Snake River Basin and Northern Basin and Range regions to the north, the region is hotter and contains higher and a greater density of mountains that have perennial streams and ponderosa pine forests at higher elevations. Also, there is less grassland and more shrubland, and the soils are mostly Aridisols rather than dry Mollisols. The region is not as hot as the Mojave and Sonoran Basin and Range ecological regions and it has a greater percent of land that is grazed.

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CE17. MOJAVE BASIN AND RANGE

This ecological region contains scattered mountains which are generally lower than those of the Central Basin and Range. Potential natural vegetation in this region is predominantly creosote bush, as compared to the mostly saltbush-greasewood and Great Basin sagebrush of the ecological region to the north, and creosote bush-bur sage with large patches of palo verde-cactus shrub and saguaro cactus in the Sonoran Basin and Range to the south. Most of this region is federally owned and there is relatively little grazing activity because of the lack of water and forage for livestock. Heavy use of off-road vehicles and motorcycles in some areas has caused severe wind and water erosion problems.

CE18. SONORAN BASIN AND RANGE

Similar to the Mojave Basin and Range to the north, this ecological region contains scattered low mountains and has large tracts of federally owned land, most of which is used for military training. However, the Sonoran Basin and Range is slightly hotter than the Mojave and contains large areas of palo verde-cactus shrub and giant saguaro cactus, whereas the potential natural vegetation in the Mojave is largely creosote bush.

CE19. NORTHERN ROCKIES

The Northern Rockies is an ecological region of high, rugged mountains. Although alpine characteristics, including numerous glacial lakes, are found in the higher elevations, the region is not as high, nor as snow and ice covered, as the Canadian Rockies. The mosaic of vegetation that presently and originally covered the region is different than that of the Middle Rockies. Although Douglas fir, subalpine fir, Englemann spruce, and ponderosa pine are characteristic of both regions, western white pine, western red cedar, and grand fir were and are common in the Northern Rockies, but not the Middle Rockies. Mining activities have caused stream water quality problems in portions of the region.

CE20. MONTANA VALLEY AND FOOTHILL PRAIRIES

The Montana Valley and Foothill Prairies is a region characterized by shortgrass prairie. It is unlike other grassland-type ecological regions in the Great Plains because of the close proximity to nearby high forested mountains which feed the region with many perennial streams, resulting in a different mosaic of terrestrial and aquatic fauna. Most of the region is farmed and many parts of the valleys have been irrigated. Grazing of beef cattle and sheep is prevalent in the region, even in the forested parts of the foothills.

CE21. MIDDLE ROCKIES

Like the Northern Rockies, this region is composed of steep-crested high mountains that are largely covered by coniferous forests. However, the mix of tree species is somewhat different in the two regions. Lodgepole pine is more common in the Middle Rockies, and white pine, grand fir, and cedar, which are prevalent in the Northern Rockies, are not in this region. Soils in the region are mainly Alfisols, whereas Inceptisols are the major soil order in the Northern Rockies. Also, a greater portion of the Middle Rockies is used for summer grazing of livestock. Recreation and lumbering are major land use activities.

CE22. WYOMING BASIN

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This ecological region is a broad intermontane basin dominated by arid grasslands and shrublands and interrupted by high hills and low mountains. Nearly surrounded by forest covered mountains, the region is somewhat drier than the Northeastern Great Plains to the northeast and does not have the extensive cover of pinyon-juniper woodland found in the Colorado Plateaus to the south. Much of the region is used for livestock grazing, although many areas lack sufficient vegetation to support this activity. The region contains major producing natural gas and petroleum fields.

CE23. WASATCH AND UINTA MOUNTAINS

This ecological region is composed of a core area of high, precipitous mountains with narrow crests and valleys flanked in some areas by dissected plateaus and open high mountains. The elevational banding pattern of vegetation is similar to that of the Southern Rockies except that aspen, chaparral, and juniper-pinyon and oak are more common at middle elevations. This characteristic, along with a far lesser extent of lodgepole pine and greater use of the region for grazing livestock in the summer months, distinguish the Wasatch and Uinta Mountains ecological region from the more northerly Middle Rockies.

CE24. COLORADO PLATEAUS

Rugged tableland topography is typical of the Colorado Plateau ecological region. Precipitous side-walls mark abrupt changes in local relief, often from 300 to 600 meters. The region is more elevated than the Wyoming Basin to the north and therefore contains a far greater extent of pinyon-juniper woodlands. However, the region also has large low lying areas containing saltbrush-greasewood (typical of hotter drier areas), which are generally not found in the higher Arizona/New Mexico Plateau to the south where grasslands are common.

CE25. SOUTHERN ROCKIES

The Southern Rockies are composed of high elevation, steep rugged mountains. Although coniferous forests cover much of the region, as in most of the mountainous regions in the western United States, vegetation, as well as soil and land use, follows a pattern of elevational banding. The lowest elevations are generally grass or shrub covered and heavily grazed. Low to middle elevations are also grazed and covered by a variety of vegetation types including Douglas fir, ponderosa pine, aspen, and juniper oak woodlands. Middle to high elevations are largely covered by coniferous forests and have little grazing activity. The highest elevations have alpine characteristics.

CE26. ARIZONA/NEW MEXICO PLATEAU

The Arizona/New Mexico Plateau represents a large transitional region between the semiarid grasslands and low relief tablelands of the Southwestern Tablelands ecological region in the east, the drier shrublands and woodland covered higher relief tablelands of the Colorado Plateau in the north, and the lower, hotter, less vegetated Mojave Basin and Range in the west and Chihuahuan Deserts in the south. Higher, more forest covered, mountainous ecological regions border the region on the northeast and southwest. Local relief in the region varies from a few meters on plains and mesa tops to well over 300 meters along tableland side slopes.

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CE27. ARIZONA/NEW MEXICO MOUNTAINS

The Arizona/New Mexico Mountains are distinguished from neighboring mountainous ecological regions by their lower elevations and an associated vegetation indicative of drier, warmer environments, which is also due in part to the region's more southerly location. Forests of spruce, fir, and Douglas fir, that are common in the Southern Rockies and the Uinta and Wasatch Mountains, are only found in a few high elevation parts of this region. Chaparral is common on the lower elevations, pinyon-juniper and oak woodlands are found on lower and middle elevations, and the higher elevations are mostly covered with open to dense ponderosa pine forests.

CE28. MADREAN ARCHIPELAGO

Also known as the Sky Islands in the United States, this is a region of basins and ranges with medium to high local relief, typically 1,000 to 1,500 meters. Native vegetation in the region is mostly grama-tobosa shrubsteppe in the basins and oak-juniper woodlands on the ranges, except at higher elevations where ponderosa pine is predominant. The region has ecological significance as both a barrier and bridge between two major cordilleras of North America, the Rocky Mountains and the Sierra Madre Occidental.

CE29. CHIHUAHUAN DESERTS

This desertic ecological region extends from the Madrean Archipelago in southeastern Arizona to the Edwards Plateau in south-central Texas. The region comprises broad basins and valleys bordered by sloping alluvial fans and terraces. Isolated mesas and mountains are located in the central and western parts of the region. Vegetative cover is predominantly arid grass and shrubland, except on the higher mountains where oak-juniper woodlands occur.

CE30. WESTERN HIGH PLAINS

Higher and drier than the Central Great Plains to the east, and in contrast to the irregular, mostly grassland or grazing land of the Northwestern Great Plains to the north, much of the Western High Plains comprises smooth to slightly irregular plains having a high percentage of cropland. Grama-buffalo grass is the potential natural vegetation in this region as compared to mostly wheatgrass-needlegrass to the north, Trans-Pecos shrub savanna to the south, and taller grasses to the east. The northern boundary of this ecological region is also the approximate northern limit of winter wheat and sorghum and the southern limit of spring wheat.

CE31. SOUTHWESTERN TABLELANDS

Unlike most adjacent Great Plains ecological regions, little of the Southwestern Tablelands is in cropland. Much of this elevated tableland is in subhumid grassland and semiarid grazing land. The potential natural vegetation in this region is grama-buffalo grass with some mesquite-buffalo grass in the southeast and shinnery (midgrass prairie with open low and shrubs) along the Canadian River.

CE32. CENTRAL GREAT PLAINS

The Central Great Plains are slightly lower, receive more precipitation, and are somewhat more irregular than the Western High Plains to the west. Once a grassland, with scattered low trees and shrubs in the south,



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much of this ecological region is now cropland, the eastern boundary of the region marking the eastern limits of the major winter wheat growing area of the United States.

CE33. FLINT HILLS

The Flint Hills is a region of limestone and shale open hills with relatively narrow steep valleys. In contrast to surrounding ecological regions that are mostly in cropland, most of the Flint Hills is grazed by beef cattle. Potential natural vegetation in the region is tallgrass prairie.

CE34. CENTRAL OKLAHOMA/TEXAS PLAINS

The Central Oklahoma/Texas Plains ecological region is a transition area between the once prairie, now winter wheat growing regions to the west, and the forested low mountains of eastern Oklahoma. The region does not possess the arability and suitability for crops such as corn and soybeans that are common in the Central Irregular Plains to the northeast. Transitional "cross-timbers" (little bluestem grassland with scattered blackjack oak and post oak trees) is the native vegetation, and presently rangeland and pastureland comprise the predominant land cover. Oil extraction has been a major activity in this region for over eighty years.

CE35. EDWARDS PLATEAU

This ecological region is largely a dissected plateau that is hillier in the south and east where it is easily distinguished from bordering ecological regions by a sharp fault line. The region contains a sparse network of perennial streams, but they are relatively clear and cool compared to those of surrounding areas. Originally covered by juniper-oak savanna and mesquite-oak savanna, most of the region is used for grazing beef cattle, sheep, goats, and wildlife. Hunting leases are a major source of income.

CE36. SOUTHERN TEXAS PLAINS

This rolling to moderately dissected plain was once covered with grassland and savanna vegetation. Having been subject to long continued grazing, thorny brush is now the predominant vegetation type. This "brush country", as it is called locally, has its greatest extent in Mexico and contains a greater and more distinct diversity of animal life than that found elsewhere in Texas

CE37. TEXAS BLACKLAND PRAIRIES

The Texas Blackland Prairies is a disjunct ecological region distinguished from surrounding regions by its fine textured clayey soils and predominantly prairie potential natural vegetation. This region now contains a higher percent of cropland than adjacent regions, although much of the land has been recently converted to urban and industrial uses.

CE38. EAST CENTRAL TEXAS PLAINS

Also called the Claypan Area, this region of irregular plains was originally covered by a post oak savanna vegetation, in contrast to the more open prairie-type regions to the north, south and west and the piney woods to the east. The bulk of this region is now used for pasture and range.

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CE39. WESTERN GULF COASTAL PLAIN

The principal distinguishing characteristics of the Western Gulf Coastal Plain are its relatively flat coastal plain topography and mainly grassland potential natural vegetation. Inland from this region the plains are more irregular and have mostly forest or savanna-type vegetation potentials. Largely because of these characteristics, a higher percentage of the land is in cropland than in bordering ecological regions. Recent urbanization and industrialization have become concerns in this region.

CE40. SOUTH CENTRAL PLAINS

Locally termed the "piney woods", this region of mostly irregular plains was once blanketed by oak-hickory-pine forests, but is now predominantly in loblolly and shortleaf pine. Only about one sixth of the region is in cropland, whereas about two thirds is in forests and woodland. Lumber and pulpwood production are major economic activities

CE41. OUACHITA MOUTAINS

The Ouachita Mountains ecological region is made up of sharply defined east-west trending ridges, formed through erosion of compressed sedimentary rock formations. Once covered by oak-hickory-pine forests, most of this region is now in loblolly and shortleaf pine. Commercial logging is the major land use in the region.

CE42. ARKANSAS VALLEY

A region of mostly forested valleys and ridges, the physiography of the Arkansas Valley is much less irregular than that of the Boston Mountains to the north and the Ouachita Mountains to the south, but is more irregular than the ecological regions to the west and east. About one fourth of the region is grazed and roughly one tenth is cropland. In the Arkansas Valley, even streams that have been relatively unimpacted by human activities have considerably lower dissolved oxygen levels, and hence support different biological communities, than those of most of the adjacent regions.

CE43. BOSTON MOUNTAINS

In contrast to the nearby Ouachita Mountains region which comprises folded and faulted linear ridges mostly covered by pine forests, the Boston Mountains ecological region consists of a deeply dissected sandstone and shale plateau, originally covered by oak-hickory forests. Red oak, white oak, and hickory remain the dominant vegetation types in this region, although shortleaf pine and eastern red cedar are found in many of the lower areas and on some south- and west-facing slopes. The region is sparsely populated and recreation is a principal land use.

CE44. OZARK HIGHLANDS

The Ozark Highlands ecological region has a more irregular physiography and is generally more forested than adjacent regions, with the exception of the Boston Mountains to the south. The majority of this dissected limestone plateau is forested; oak-hickory is the predominant type, but stands of oak and pine are



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also common. Less than one fourth of the core of this region has been cleared for pasture and cropland, but half or more of the periphery, while not as agricultural as bordering ecological regions, is in cropland and pasture.

**CE45. CENTRAL IRREGULAR PLAINS**

The Central Irregular Plains has a mix of land use types and tends to be topographically more irregular than the Western Corn Belt Plains to the north, where most of the land is in crops. The region is less irregular and less forest covered than the ecological regions to the south and east. The potential natural vegetation of this ecological region is a grassland/forest mosaic with wider forested strips along the streams compared to the region to the north. The mix of land use activities in the Central Irregular Plains also includes mining operations of high-sulfur bituminous coal. The disturbance of these coal strata in southern Iowa and northern Missouri has degraded water quality and affected aquatic biota.

**CE46. CANADIAN ROCKIES**

As its name indicates, most of this region is located in Canada. It straddles the border between Alberta and British Columbia in Canada and extends southeastward into northwestern Montana. The region is generally higher and more ice-covered than the Northern Rockies. Vegetation is mostly Douglas fir, spruce, and lodgepole pine at lower elevations and alpine fir at middle elevations. The higher elevations are treeless alpine. A large part of the region is in national parks where tourism is the major land use. Forestry and mining occur on the non-park lands.

**CE47. NORTHWESTERN GLACIATED PLAINS**

The Northwestern Glaciated Plains ecological region is a transitional region between the generally more level, moister, more agricultural Northern Glaciated Plains to the east and the generally more irregular, dryer, Northwestern Great Plains to the west and southwest. The western and southwestern boundary roughly coincides with the limits of continental glaciation. Pocking this ecological region is a moderately high concentration of semi-permanent and seasonal wetlands, locally referred to as Prairie Potholes.

**CE48. NORTHWESTERN GREAT PLAINS**

The Northwestern Great Plains ecological region encompasses the Missouri Plateau section of the Great Plains. It is a semiarid rolling plain of shale and sandstone punctuated by occasional buttes. Native grasslands, largely replaced on level ground by spring wheat and alfalfa, persist in rangeland areas on broken topography. Agriculture is restricted by the erratic precipitation and limited opportunities for irrigation.

**CE49. NEBRASKA SANDHILLS**

The Nebraska Sandhills comprise one of the most distinct and homogenous ecological regions in North America. One of the largest areas of grass stabilized sand dunes in the world, this region is generally devoid of cropland agriculture, and except for some riparian areas in the north and east, the region is treeless. Large portions of this ecological region contain numerous lakes and wetlands and have a lack of streams.

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CE50. NORTHERN GLACIATED PLAINS

The Northern Glaciated Plains ecological region is characterized by a flat to gently rolling landscape underlain by glacial till. The subhumid conditions foster a transitional grassland containing tallgrass and shortgrass prairie. High concentrations of temporary and seasonal wetlands create favorable conditions for waterfowl nesting and migration. Though the till soils are very fertile, agricultural success is subject to annual climatic fluctuations.

CE51. WESTERN CORN BELT PLAINS

Once covered with tallgrass prairie, over 75 percent of the Western Corn Belt Plains is now used for cropland agriculture and much of the remainder is in forage for livestock. A combination of nearly level to gently rolling glaciated till plains and hilly loess plains, an average annual precipitation of 63 - 89 cm which occurs mainly in the growing season, and fertile, warm, moist soils make this one of the most productive areas of corn and soybeans in the world. The region is also one of major environmental concerns regarding surface and groundwater contamination from fertilizer and pesticide applications as well as livestock concentrations.

CE52. LAKE AGASSIZ PLAIN

Glacial Lake Agassiz was the last in a series of proglacial lakes to fill the Red River valley in the three million years since the beginning of the Pleistocene. Thick beds of lake sediments on top of glacial till create the extremely flat floor of the Lake Agassiz Plain. The historic tallgrass prairie has been replaced by intensive row crop agriculture. The preferred crops in the northern half of the region are potatoes, beans, sugar beets and wheat; soybeans, sugar beets, and corn predominate in the south.

CE53. NORTHERN MINNESOTA WETLANDS

Much of the Northern Minnesota Wetlands is a vast and nearly level marsh that is sparsely inhabited by humans and covered by swamp and boreal forest vegetation. Formerly occupied by broad glacial lakes, most of the flat terrain in this ecological region is still covered by standing water.

CE54. NORTHERN LAKES AND FORESTS

The Northern Lakes and Forests is a region of nutrient poor glacial soils, coniferous and northern hardwood forests, undulating till plains, morainal hills, broad lacustrine basins, and extensive sandy outwash plains. Soils in this ecological region are thicker than in those to the north and generally lack the arability of soils in adjacent ecological regions to the south. The numerous lakes that dot the landscape are clearer and less productive than those in ecological regions to the south.

CE55. NORTH CENTRAL HARDWOOD FORESTS

The North Central Hardwood Forests is transitional between the predominantly forested Northern Lakes and Forests and the agricultural ecological regions to the south. Land use/land cover in this ecological region consists of a mosaic forests, wetlands and lakes, cropland agriculture, pasture, and dairy operations.

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CE56. DRIFTLESS AREA

The hilly uplands of the Driftless Area easily distinguish it from the surrounding ecological regions. Much of the area consists of a loess-capped plateau, deeply dissected by streams. Also called the Paleozoic Plateau, because there is evidence of glacial drift in this region, the glacial deposits have done little to affect the landscape compared to the subduing influences in adjacent ecological regions. Livestock and dairy farming are major land uses and have had a major impact on stream quality.

CE57. SOUTHEASTERN WISCONSIN TILL PLAINS

The Southeastern Wisconsin Till Plains supports a mosaic of vegetation types, representing a transition between the hardwood forests and oak savannas of the ecological regions to the west and the tall-grass prairies of the Central Corn Belt Plains to the south. Like the Corn Belt Plains, land use in the Southeastern Wisconsin Till Plains is mostly cropland, but the crops are largely forage and feed grains to support dairy operations, rather than corn and soybeans for cash crops.

CE58. CENTRAL CORN BELT PLAINS

Extensive prairie communities intermixed with oak hickory forests were native to the glaciated plains of the Central Corn Belt Plains; they were a stark contrast to the hardwood forests that grew on the drift plains of ecological regions to the east. Ecological regions to the west were mostly treeless except along larger streams. Beginning in the nineteenth century, the natural vegetation was gradually replaced by agriculture. Farms are now extensive on the dark, fertile soils of the Central Corn Belt Plains and mainly produce corn and soybeans; cattle, sheep, poultry, and especially hogs are also raised, but they are not as dominant as in the drier Western Corn Belt Plains to the west. Agriculture has affected stream chemistry, turbidity, and habitat.

CE59. EASTERN CORN BELT PLAINS

The Eastern Corn Belt Plains is primarily a rolling plain with local end moraines; it had more natural tree cover and has lighter colored soils than the Central Corn Belt Plains. The region has loamier and better-drained soils than the Huron/Erie Lake Plain, and richer soils than the Erie/Ontario Hills and Lake Plain. Glacial deposits of Wisconsin age are extensive. They are not as dissected nor as leached as the pre-Wisconsin till which is restricted to the southern part of the region. Originally, beech forests were common on Wisconsin soils while beech forests and elm-ash swamp forests dominated the wetter pre-Wisconsin soils. Today, extensive corn, soybean, and livestock production occurs and has affected stream chemistry and turbidity.

CE60. SOUTHERN MICHIGAN/NORTHERN INDIANA DRIFT PLAINS

Bordered by Lake Michigan on the west, this ecological region is less agricultural than those to the south, it is more well drained and contains more lakes than the flat agricultural lake plain to the east, and its soils are not as nutrient poor as the region to the north. The region is characterized by many lakes and marshes as well as an assortment of landforms, soil types, soil textures, and land uses. Broad till plains with thick and complex deposits of drift, paleobeach ridges, relict dunes, morainal hills, kames, drumlins, meltwater

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channels, and kettles occur. Feed grain, soybean, and livestock farming as well as woodlots, quarries, recreational development, and urban-industrial areas are common

CE61. HURON/ERIE LAKE PLAIN

The Huron/Erie Lake Plain is a broad, fertile, nearly flat plain punctuated by relic sand dunes, beach ridges, and end moraines. Originally, soil drainage was typically poorer than in the adjacent Eastern Corn Belt Plains, and elm-ash swamp and beech forests were dominant. Oak savanna was typically restricted to sandy, well-drained dunes and beach ridges. Today, most of the area has been cleared and artificially drained and contains highly productive farms producing corn, soybeans, livestock, and vegetables; urban and industrial areas are also extensive. Stream habitat and quality have been degraded by channelization, ditching, and agricultural activities.

CE62. NORTHEASTERN HIGHLANDS

The Northeastern Highlands comprise a relatively sparsely populated region characterized by nutrient poor soils blanketed by northern hardwood and spruce fir forests. Land-surface form in the region grades from low mountains in the southwest and central portions to open high hills in the northeast. Many of the numerous glacial lakes in this region have been acidified by sulfur depositions originating in industrialized areas upwind from the ecological region to the west.

CE63. NORTHEASTERN COASTAL ZONE

Like the Northeastern Highlands, the Northeastern Coastal Zone contains relatively nutrient poor soils and concentrations of continental glacial lakes, some of which are sensitive to acidification; however, this ecological region contains considerably less surface irregularity and much greater concentrations of human population. Although attempts were made to farm much of the Northeastern Coastal Zone after the region was settled by Europeans, land use now mainly consists of forests and residential development.

CE64. LAURENTIAN PLAINS AND HILLS

This mostly forested region of dense concentrations of continental glacial lakes is less rugged than the Northeastern Highlands to the west and considerably less populated than the ecological region to the south. Vegetation here is mostly spruce-fir with some patches of maple, beech birch and the soils are predominantly Spodosols. By contrast, the forests in the Northeastern Coastal Zone to the south are mostly white, red, and jack pine and oak-hickory, and the soils are generally Inceptisols and Oxisols.

CE65. NORTHERN APPALACHIAN PLATEAU AND UPLANDS

The Northern Appalachian Plateau and Uplands comprise a transition region between the less irregular, more agricultural and urbanized Erie/Ontario Drift and Lake Plain ecological region and the more mountainous and forested, less populated North Central Appalachians and Northeastern Highlands ecological regions. Much of this region is farmed and in pasture, with hay and grain for dairy cattle being the principal crops, but large areas are in forests of oak and northern hardwoods.

CE66. ERIE DRIFT PLAINS

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Once largely covered by a maple-beech-birch forest, much of the Erie Drift Plain is now in farms, many associated with dairy operations. The Eastern Corn Belt Plains, which border the region on the west, are flatter, more fertile, and therefore more agricultural. The glaciated Erie Drift Plain is characterized by low rounded hills, scattered end moraines, kettles, and areas of wetlands, in contrast to the adjacent unglaciated ecological regions to the south and east that are more hilly and less agricultural. Areas of urban development and industrial activity occur locally.

CE67. EASTERN GREAT LAKES AND HUDSON LOWLANDS

This glaciated region of irregular plains bordered by hills generally contains less surface irregularity and more agricultural activity and population density than the adjacent Northeastern Highlands and Northern Appalachian Plateau and Uplands ecological regions. Although orchards, vineyards, and vegetable farming are important locally, a large percentage of the agriculture is associated with dairy operations. The portion of this ecological region that is in close proximity to the Great Lakes experiences and increased growing season, more winter cloudiness, and greater snowfall.

CE68. NORTH CENTRAL APPALACHIANS

More forest covered than most adjacent ecological regions, the North Central Appalachians ecological region is part of a vast, elevated plateau composed of horizontally bedded sandstone, shale, siltstone, conglomerate, and coal. It is made up of plateau surfaces, high hills, and low mountains, which unlike the ecological regions to the north and west, was largely unaffected by continental glaciation. Only a portion of the Poconos section in the east has been glaciated. Land use activities are generally tied to forestry and recreation, but some coal and gas extraction occurs in the west.

CE69. MIDDLE ATLANTIC COASTAL PLAIN

The Middle Atlantic Coastal Plain ecological region is a flat plain, with many swampy or marshy areas. Forest cover in the region is predominantly loblolly-shortleaf pine with patches of oak, gum, and cypress near major streams, as compared to the mainly longleaf-slash pine forests of the warmer Southern Coastal Plain. The central and southwestern parts of this region have poorly drained soils and only about 15 percent of the land is in cropland, whereas in the northeastern parts soils are not as poorly drained and 20 to 40 percent of the land is in cropland.

CE70. ATLANTIC COASTAL PINE BARRENS

This ecological region is distinguished from the coastal ecological region to the south by its coarser grained soils and oak-pine potential natural vegetation, as compared to forests including hickory. Appalachian Oak forests and northern hardwoods were found in the coastal ecological region to the north. The physiography of this ecological region is not as flat as that of the Middle Atlantic Coastal Plain, but it is not as irregular as that of the Northeastern Coastal Zone.

CE71. NORTHERN PIEDMONT

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The Northern Piedmont is transitional region of low rounded hills, irregular plains, and open valleys in contrast to the low mountains of ecological regions to the north and west and the flat coastal plains of the ecological region to the east. Potential natural vegetation here was predominantly Appalachian oak forest as compared to the mostly oak-hickory-pine forests of the Piedmont ecological region to the southwest.

CE72. PIEDMONT

Considered the non-mountainous portion of the old Appalachians Highland by physiographers, the northeast-southwest trending Piedmont ecological region comprises a transitional area between the mostly mountainous ecological regions of the Appalachians to the northwest and the flat coastal plain to the southeast. Once largely cultivated, much of this region has reverted to pine and hardwood woodlands.

CE73. SOUTHEASTERN PLAINS

These irregular plains have a mosaic of cropland, pasture, woodland, and forest. Natural vegetation is mostly oak-hickory-pine and Southern mixed forest. The Cretaceous or Tertiary-age sands, silts, and clays of the region contrast geologically to the older igneous and metamorphic rocks of the Piedmont, and the older limestone, chert, and shale found in the Interior Plateau. Streams in this area are relatively low-gradient and sandy-bottomed.

CE74. BLUE RIDGE MOUNTAINS

The Blue Ridge Mountains extend from southern Pennsylvania to northern Georgia, varying from narrow ridges to hilly plateaus to more massive mountainous areas with high peaks. The mostly forested slopes, high-gradient, cool, clear streams, and rugged terrain occur on a mix of igneous, metamorphic, and sedimentary geology. Annual precipitation of over 200 centimeters can occur on the well-exposed high peaks of the Great Smoky Mountains that reach over 1830 meters. The southern Blue Ridge is one of the richest centers of biodiversity in the eastern U.S. It is one of the most floristically diverse ecological regions, and includes Appalachian oak forests, northern hardwoods, and Southeastern spruce-fir forests. Shrub, grass, and heath balds, hemlock, cove hardwoods, and oak-pine communities are also significant.

CE75. RIDGE AND VALLEY

This northeast-southwest trending, relatively low-lying, but diverse ecological region is sandwiched between generally higher, more rugged mountainous regions with greater forest cover. As a result of extreme folding and faulting events, the region's roughly parallel ridges and valleys have a variety of widths, heights, and geologic materials, including limestone, dolomite, shale, siltstone, sandstone, chert, mudstone, and marble. Springs and caves are relatively numerous. Present-day forests cover about 50% of the region. The ecological region has a diversity of aquatic habitats and species of fish.

CE76. SOUTHWESTERN APPALACHIANS

Stretching from Kentucky to Alabama, these open low mountains contain a mosaic of forest and woodland with some cropland and pasture. The eastern boundary of the ecological region in Tennessee, along the more abrupt escarpment where it meets the Ridge and Valley, is relatively smooth and only slightly notched by small eastward flowing stream drainages. The western boundary, next to the Interior Plateau's Eastern



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Highland Rim, is more crenulated, with a rougher escarpment that is more deeply incised. The mixed mesophytic forest is restricted mostly to the deeper ravines and escarpment slopes, and the upland forests are dominated by mixed oaks with shortleaf pine.

CE77. CENTRAL APPALACHIANS

The Central Appalachian ecological region, stretching from central Pennsylvania to northern Tennessee, is primarily a high, dissected, rugged plateau composed of sandstone, shale, conglomerate, and coal. The rugged terrain, cool climate, and infertile soils limit agriculture, resulting in a mostly forested land cover. The high hills and low mountains are covered by a mixed mesophytic forest with areas of Appalachian oak and northern hardwood forest. Bituminous coal mines are common, and have caused the siltation and acidification of streams.

CE78. WESTERN ALLEGHENY PLATEAU

The hilly and wooded terrain of the Western Allegheny Plateau was not muted by glaciation and is more rugged than the agricultural till plains of ecological regions to the north and west, but is less rugged and not as forested as ecological regions to the east and south. Extensive mixed mesophytic forests and mixed oak forests originally grew in the Western Allegheny Plateau and, today, most of its rounded hills remain in forest; dairy, livestock, and general farms as well as residential developments are concentrated in the valleys. Horizontally-bedded, sedimentary rock underlying the region has been mined for bituminous coal.

CE79. INTERIOR PLATEAU

The Interior Plateau is a diverse ecological region extending from southern Indiana and Ohio to northern Alabama. Rock types are distinctly different from the coastal plain sands and alluvial deposits to the west, and elevations are lower than the Appalachian ecological regions to the east. Mississippian to Ordovician-age limestone, chert, sandstone, siltstone and shale compose the landforms of open hills, irregular plains, and tablelands. The natural vegetation is primarily oak-hickory forest, with some areas of bluestem prairie and cedar glades. The region has a diverse fish fauna.

CE80. INTERIOR RIVER LOWLAND

The Interior River Lowland is made up of many wide, flat-bottomed terraced valleys, forested valley walls, and dissected glacial till plains. In contrast to the generally rolling to slightly irregular plains in adjacent ecological regions to the north, east and west, where most of the land is cultivated for corn and soybeans. A little less than half of this area is in cropland, about 30 percent is in pasture, and the remainder is in pasture.

CE81. MISSISSIPPI ALLUVIAL PLAIN

This riverine ecological region extends from southern Illinois, at the confluence of the Ohio River with the Mississippi River, south to the Gulf of Mexico. It is mostly a flat, broad floodplain with river terraces and levees providing the main elements of relief. Soils tend to be poorly drained, except for the areas of sandy soils. Winters are mild and summers are hot, with temperatures and precipitation increasing from north to south. Bottomland deciduous forest vegetation covered the region before much of it was cleared for

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cultivation. Presently, most of the northern and central parts of the region are in cropland and receive heavy treatments of insecticides and herbicides. Soybeans, cotton, and rice are the major crops.

CE82. MISSISSIPPI VALLEY LOESS PLAINS

This ecological region stretches from near the Ohio River in western Kentucky to Louisiana. It consists primarily of irregular plains, with oak-hickory and oak-hickory-pine natural vegetation. Thick loess tends to be the distinguishing characteristic. With flatter topography than the Southeastern Plains ecological region to the east, streams tend to have less gradient and more silty substrates. Agriculture is the dominant land use in the Kentucky and Tennessee portion of the region, while in Mississippi there is a mosaic of forest and cropland.

CE83. SOUTHERN COASTAL PLAIN

The Southern Coastal Plain consists of mostly flat plains with numerous swamps, marshes and lakes. This ecological region is warmer, heterogeneous, and has a longer growing season and coarser textured soils than the Middle Atlantic Coastal Plain. Once covered by a forest of beech, sweetgum, southern magnolia, slash pine, loblolly pine, white oak, and laurel oak, land cover in the region is now mostly longleaf-slash pine forest, oak-gum-cypress forest in some low lying areas, pasture for beef cattle, and urban development.

CE84. SOUTHERN FLORIDA COASTAL PLAIN

The frost free climate of the Southern Florida Coastal Plain makes it distinct from other ecological regions in the conterminous United States. This region is characterized by flat plains with wet soils, marshland and swamp land cover with everglades and palmetto prairie vegetation types. Although portions of this region are in parks, game refuges, and Indian reservations, a large part of the region has undergone extensive hydrological and biological alteration.